Necessity of having a standard of small force:

AFM study of

nano-mechanical properties

of human cells
and
other soft nanostructured materials

Igor Sokolov

Depts. of Physics, Chemistry,

Center for Advanced Material Processing,

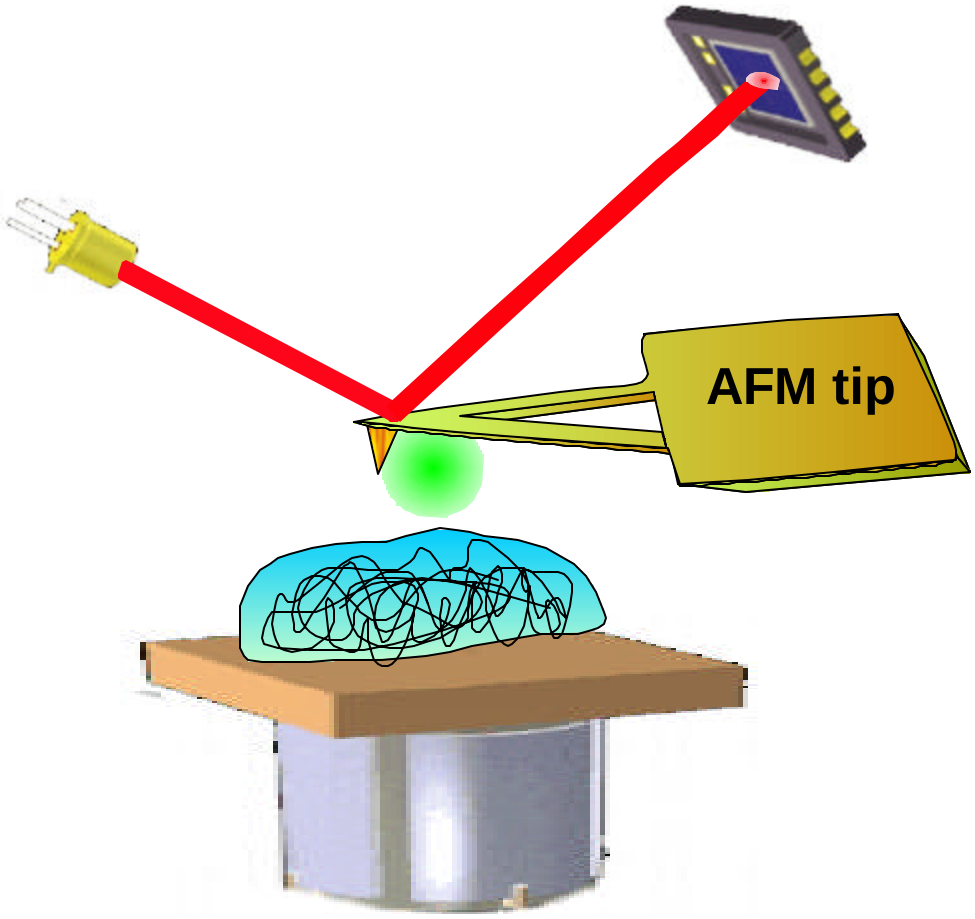
Clarkson University, Potsdam, NY 13699

Workshop on Reliability of Nanomaterial, NIST, Colorado, 2004

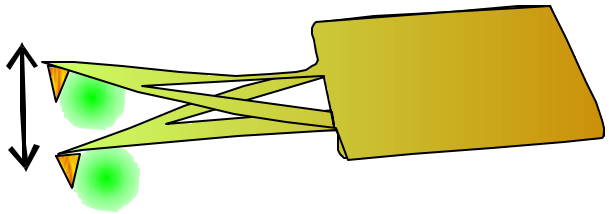
Some areas of my research:

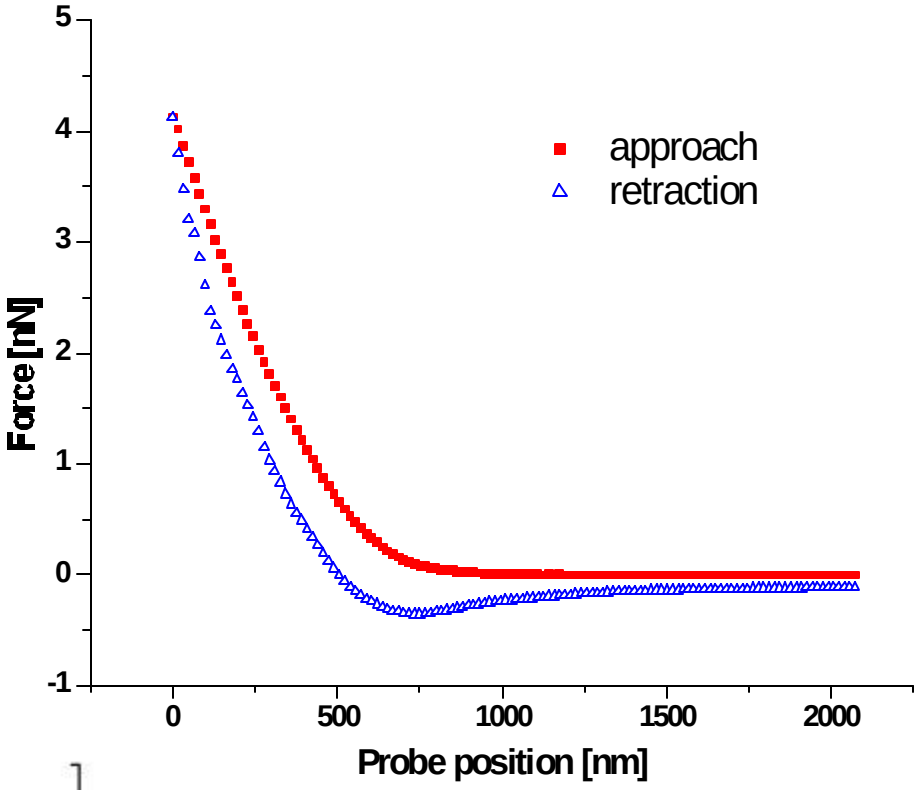
- mechanical properties of cells,
- intermolecular interactions,
- new materials: 3D nanoporous glasses, self-healing materials

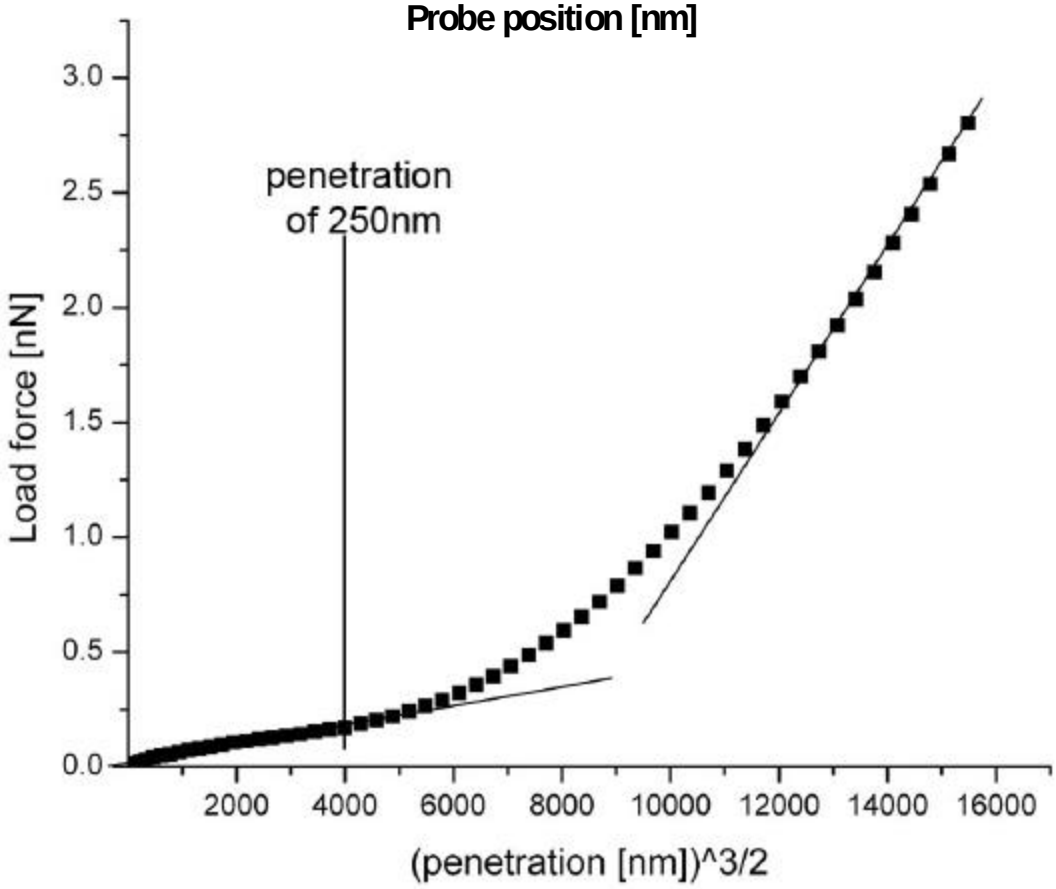
How we study the mechanical properties of cells and soft nanostructured materials



deflection can be as high as 1 micron !







The need

Absolute accuracy of the AFM measurements is low

The bottleneck is
the spring constant calibration

For small deflections needed for force measurements,
the accuracy can be ~1% (thermal osculation calibration),
large deflections: ~20% at best

The question relating to reliability of nanomaterials I'd lime to see addressed in this workshop and report/roadmap

Development of the ways for precise calibration of the spring constant of the AFM cantilevers for the case of large deflections